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CLAIMS

[Claim(s)]

[Claim 1]An electronic camera comprising:

An image pick-up part which obtains electronic image data which changes light from a photographic subject into an electrical signal, and in which an object image is shown.

A GPS receiving set which receives an electric wave from a GPS Satellite.

A camera station acquired based on an electric wave received with said GPS receiving set to photographed image data acquired via said image pick-up part, and information on time.

An encipherment information synthesizing means which enciphers these information according to a predetermined format while adding information which shows individual identification numerals of the electronic camera concerned, A nonvolatile storage means which records data which passed through said encipherment information synthesizing means, A data output part for taking out data which passed through said encipherment information synthesizing means to the exterior of the device concerned, A storing means which surrounds said image pick-up part, said encipherment information synthesizing means, and said nonvolatile storage means, and seals these mechanically and electrically, An opening discriminating means which can exterior distinguish existence of opening of said storing means, an opening detection means to detect existence of opening of said storing means electrically, and an alteration checking means which makes use impossible data memorized by said nonvolatile storage means when opening is detected by said opening detection means.

[Claim 2]The electronic camera according to claim 1, wherein it builds in a backup power supply and a series of sequences from concern of opening by said opening detection means to an operation of said alteration checking means are performed by current supply from said backup power supply.

[Claim 3]a time check -- a case where a photograph is taken under a situation where a means is built in and an electric wave from a GPS Satellite cannot be received -- said time check -- the electronic camera according to claim 1 adding time based on a means, and lapsed time after an electric wave stops reaching to photographed image data, and recording them.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the electronic camera which can prevent alteration and an alteration of data while it relates to an electronic camera, especially records the information on a photographing date, a photographing location, etc. with image data.

[0002]

[Description of the Prior Art]The proposal which gives material evidence nature to the image data photoed with the video camera from the former is made (JP,8-97927,A, JP,7-50827,A). For example, in JP,8-97927,A, the method of compounding a photographing date (temporal data) and a photographing location (position data) to image data is indicated using GPS (global positioning system).

[0003]

[Problem(s) to be Solved by the Invention]However, protective measures [as opposed to the alteration or the alteration after data acquisition with the method by which the conventional proposal is made] are imperfect and vulnerable. This invention was made in view of such a situation, and an object of this invention is to provide the electronic camera which makes it possible to add a photographing date and the information on a position to the data of the photoed picture, and to prevent alteration and an alteration of these data and to give sufficient material evidence nature for shot data.

[0004]

[Means for Solving the Problem]In order to attain said purpose, an electronic camera concerning this invention is provided with the following.

An image pick-up part which obtains electronic image data which changes light from a photographic subject into an electrical signal, and in which an object image is shown.

A GPS receiving set which receives an electric wave from a GPS Satellite.

While adding information on a camera station acquired based on an electric wave received with said GPS receiving set to photographed image data acquired via said image pick-up part, and time, and information which shows individual identification numerals of the electronic camera concerned, An encipherment information synthesizing means which enciphers these information according to a predetermined format, A nonvolatile storage means which records data which passed through said encipherment information synthesizing means, A data output part for taking out data which passed through said encipherment information synthesizing means to the exterior of the device concerned, A storing means which surrounds said image pick-up part, said encipherment information synthesizing means, and said nonvolatile storage means, and seals these mechanically and electrically, An opening discriminating means which can exterior distinguish existence of opening of said storing means, an opening detection means to detect existence of opening of said storing means electrically, and an alteration checking means which makes use impossible data memorized by said nonvolatile storage means when opening is detected by said opening detection means.

[0005]According to this invention, a camera station and date information which were acquired

from a GPS receiving set are automatically added to image data photoed through an image pick-up part, and these information is recorded with information on individual identification numerals of the electronic camera concerned. Since information is enciphered according to a predetermined format on the occasion of this recording processing, alteration and an alteration after data acquisition become difficult.

[0006]The seal (sealing) of an image pick-up part, an encipherment information synthesizing means, and the nonvolatile storage means is carried out mechanically and electrically by storing means, and if they do not destroy a part of storing means, they have structure which cannot access an inside. And when a seal of a storing means is broken, can recognize visually easily by a discriminating means, and. It is electrically detected by an opening detection means, the alteration checking means operates based on this detection, and it is preventing from using data within a nonvolatile storage means by elimination, destruction, and other suitable methods.

[0007]The credibility of data can be proved and sufficient material evidence nature for shot data can be given because this compares data saved in an inside of an electronic camera, and data taken out outside via a data output part.

[0008]

[Embodiment of the Invention]The desirable embodiment of the electronic camera built over this invention according to an accompanying drawing below is described. Drawing 1 is a block diagram showing the composition of the electronic camera concerning an embodiment of the invention. This electronic camera 10 is added to the fundamental component of electronic cameras, such as the taking lens 12, the image pick-up part 14, the finder combination monitor 16, the power supply section 18, and the image recording input-and-output (I/O) part 20, It has the GPS receiving set 22 which receives the electric wave from a GPS Satellite, the encipherment information synchronizer 24, the photography shot recording memory (equivalent to a nonvolatile storage means) 26, the internal clock (time check a means fairly) 28, and the backup internal power supply 30.

[0009]Especially, . Mechanical [in the case 32 (equivalent to a storing means)] about the portion (element) concerning acquisition and record of the data of the image pick-up part 14, the GPS receiving set 22, the encipherment information synchronizer 24, the internal clock 28, the backup internal power supply 30, the image recording I/O part 20, the photography shot recording memory 26, etc. And it is stored where a seal (sealing) is carried out electrically, and it has structure which cannot alter data from the exterior.

[0010]. [whether an inside can be accessed, if the case 32 is pasted up or welded and does not specifically destroy the case 32, and] Or it enables it to check opening physically by making it the structure which cannot access an inside unless it is sealed in the screw (un-illustrating) which joins the case 32, it destroys a seal and it removes a screw. The opening detecting switch 34 is formed in the inside of the case 32 by which the seal was carried out, or the case 32, if the seal of the case 32 is broken, the opening detecting switch 34 will operate, the information in the photography shot recording memory 26 is eliminated, and it is constituted so that opening can be distinguished also electrically.

[0011]The image pick-up part 14 is changed into electronic image data through predetermined signal processing, after photoelectric conversion of the object image which carried out image formation to the acceptance surface of the image sensor via the taking lens 12 is carried out here including image sensors, such as CCD which is not illustrated. GPS (earth positioning system) is a system which can receive the electric wave transmitted from two or more satellites launched by the universe, and can know the exact position on the earth in real time like common knowledge. The position and information on time are included in the electric wave emitted from each satellite, and the exact information on the present position (camera station) and time (photographing date) on the earth can be acquired by receiving the electric

wave from a satellite with the GPS receiving set 22.

[0012]The position and date information which were acquired from the GPS receiving set 22 are added to the image data of the photographic subject photoed through the image pick-up part 14, and these data is recorded on it with the information on the device individual numbers (equivalent to individual identification numerals) of the electronic camera 10 concerned. In particular, in consideration of the prevention from alteration of data, according to a secret format, it is enciphered in the encipherment information synchronizer 24, and distributed record of the data of a camera station and time and the data of device individual numbers is carried out into picture information.

[0013]For example, it is possible to embed as a code all over a picture in the way of a digital watermark. Unlike the writing to the header information of the file usually performed, by performing such encryption processing, the difficulty of an alteration of data becomes high. In this way, the enciphered data can be accepted and decoded by using predetermined decoding software, and alteration of data and an alteration become much more difficult by securing the format of encryption, and the confidentiality of decoding software.

[0014]the image data into which a camera station and other attached information were woven in the encipherment information synchronizer 24 passes the image recording I/O part 20 -- ream -- it is recorded on the bubble medium (for example, external recording media, such as a mass image memory card) 36. Data may be transmitted to another server etc. which are replaced with the writing of the data to the external recording media 36, and are not illustrated using the transmission device 38.

[0015]Nonvolatile memory is used for the photography shot recording memory 26, Record-keeping of the camera station of all the taken images photoed by the electronic camera 10 concerned and each photography shot, time, picture data size information, and the other attached information is carried out to this photography shot recording memory 26 simultaneously with photography. Although the photography shot recording memory 26 cannot make writing and correction of data by access from the electronic camera 10 outside, read-out of data is possible for it via the image recording I/O part 20.

[0016]Thus, since picture information and its attached information are saved simultaneously with photography at built-in nonvolatile memory (photography shot recording memory 26) and it was made to keep the information about all the photoed shots, It becomes possible to prove the credibility of data by comparing the data which was written in the external recording media 36 and taken out by the exterior of the electronic camera 10, and the data kept inside the device of the electronic camera 10.

[0017]Since it has the structure where the data of the photography shot recording memory 26 is eliminated if the opening detecting switch 34 detects opening of the case 32, the alteration of the data kept in the device of the electronic camera 10 is impossible. Processing special to data besides the method of eliminating data as a method of making use impossible the data in the photography shot recording memory 26 may be performed, and data may be processed or destroyed.

[0018]A series of sequences from the unsealing detection of the case 32 to data cancellation are performed by the electric power supply from the backup internal power supply 30, and even if there is no usual external power 18, they operate. Therefore, it is guaranteed that the data currently preserved by the nonvolatile memory (photography shot recording memory 26) built in the electronic camera 10 is the genuine data acquired by the photography which used the electronic camera 10 concerned.

[0019]By the way, when the electric wave from GPS Satellites, such as indoor, is unreceivable (at the time of GPS radio wave un-reaching), that is displayed on the finder combination monitor 16, and a photography person is notified. When performing photography under this GPS radio wave situation where it does not reach, Although the exact position and

date information by a GPS radio wave are unacquirable, the time which the internal clock 28 shows, and the lapsed time after a GPS radio wave is un-reaching are recorded on the photography shot recording memory 26 with image data, using the internal clock 28 as a second best measure.

[0020]And after taking a photograph under GPS radio wave the situation where it does not reach, it moves to the good point of a radio wave state as promptly as possible, GPS operation is checked, and photography for a check is performed there. Since the information on the exact camera station and time based on a GPS radio wave is added and recorded on the photographed image data for this check, The approximation nature of the position (place) from which both data was acquired can be presumed by combining the data for the check concerned, and the data acquired under the electric wave situation where it does not reach.

[0021]That is, since the error span of both camera station can presume to some extent based on the lapsed time from the photography under electric wave the situation where it does not reach to the photographed-image-data acquisition for a check, the approximate guarantee of the position information which diverts the camera station information on the image data for a check, and starts the data under electric wave the situation where it does not reach can be offered. In order to utilize effectively the electronic camera constituted like the above, the material evidence nature of data is secured by setting an appropriate public institution which is a court and carrying the data obtained by photography and the photoed electronic camera 10 into a public institution.

[0022]Namely, in a public institution, it is shown that the seal of the case 32 of the electronic camera 10 is maintained, It becomes possible to guarantee the credibility of data by comparing the photography shot data currently kept by the nonvolatile memory (26) in a camera as compared with the data currently recorded on the medium of the external recording media 36 grade. About the information enciphered, it is letting image data pass to predetermined decoding software, and specification of a camera station (place), a photographing date, and the electronic camera used for photography can be performed.

[0023]Generally except for a public institution, only the inspection of data of the code format used when embedding attached information, such as a camera station and time, to image data is enabled by using predetermined decoding software to a third party as what is not exhibited. By using such an electronic camera, it becomes possible to give material evidence nature to the data photoed with the electronic camera 10 concerned.

[0024]Although the above-mentioned embodiment explained the electronic camera which records a still picture to the example, this invention is applicable also to the electronic camera which records an animation.

[0025]

[Effect of the Invention]As explained above, according to the electronic camera concerning this invention, add a camera station and date information to the image data acquired through the photographing part automatically using GPS, and. Since the individual identification numerals of the electronic camera concerned are added, these data is enciphered and it was made to record, the alteration and the alteration after data acquisition are difficult, and can give material evidence nature to photographed image data.

[0026]If a part of storing means is not destroyed, when it has structure which cannot access an inside and the seal of a storing means is broken, can recognize especially the electronic camera of this invention visually easily by a discriminating means, and. Since it prevented from using data, it being detected electrically and eliminating the data within a nonvolatile storage means based on this detection by an opening detection means, etc., By comparing the data saved at the nonvolatile storage means inside an electronic camera, and the data taken out outside via the data output part, the credibility of data can be proved and sufficient material evidence nature for shot data can be given.

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TECHNICAL FIELD

[Field of the Invention]This invention relates to the electronic camera which can prevent alteration and an alteration of data while it relates to an electronic camera, especially records the information on a photographing date, a photographing location, etc. with image data.

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PRIOR ART

[Description of the Prior Art]The proposal which gives material evidence nature to the image data photoed with the video camera from the former is made (JP,8-97927,A, JP,7-50827,A). For example, in JP,8-97927,A, the method of compounding a photographing date (temporal data) and a photographing location (position data) to image data is indicated using GPS (global positioning system).

[0003]

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EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, according to the electronic camera concerning this invention, add a camera station and date information to the image data acquired through the photographing part automatically using GPS, and. Since the individual identification numerals of the electronic camera concerned are added, these data is enciphered and it was made to record, the alteration and the alteration after data acquisition are difficult, and can give material evidence nature to photographed image data.

[0026]If the electronic camera in particular of this invention does not destroy a part of storing means, it has structure which cannot access an inside.

When the seal of a storing means is broken, can recognize visually easily by a discriminating means, and. Since it prevented from using data, it being detected electrically and eliminating the data within a nonvolatile storage means based on this detection by an opening detection means, etc., By comparing the data saved at the nonvolatile storage means inside an electronic camera, and the data taken out outside via the data output part, the credibility of data can be proved and sufficient material evidence nature for shot data can be given.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, protective measures [as opposed to the alteration or the alteration after data acquisition with the method by which the conventional proposal is made] are imperfect and vulnerable. This invention was made in view of such a situation, and an object of this invention is to provide the electronic camera which makes it possible to add a photographing date and the information on a position to the data of the

photoed picture, and to prevent alteration and an alteration of these data and to give sufficient material evidence nature for shot data.

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MEANS

[Means for Solving the Problem]In order to attain said purpose, an electronic camera concerning this invention is provided with the following.

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An image pick-up part which obtains electronic image data which changes light from a photographic subject into an electrical signal, and in which an object image is shown.

A GPS receiving set which receives an electric wave from a GPS Satellite.

While adding information on a camera station acquired based on an electric wave received with said GPS receiving set to photographed image data acquired via said image pick-up part, and time, and information which shows individual identification numerals of the electronic camera concerned, An encipherment information synthesizing means which enciphers these information according to a predetermined format, A nonvolatile storage means which records data which passed through said encipherment information synthesizing means, A data output part for taking out data which passed through said encipherment information synthesizing means to the exterior of the device concerned, A storing means which surrounds said image pick-up part, said encipherment information synthesizing means, and said nonvolatile storage means, and seals these mechanically and electrically, An opening discriminating means which can exterior distinguish existence of opening of said storing means, an opening detection means to detect existence of opening of said storing means electrically, and an alteration checking means which makes use impossible data memorized by said nonvolatile storage means when opening is detected by said opening detection means.

[0005]According to this invention, a camera station and date information which were acquired from a GPS receiving set are automatically added to image data photoed through an image pick-up part, and these information is recorded with information on individual identification numerals of the electronic camera concerned. Since information is enciphered according to a predetermined format on the occasion of this recording processing, alteration and an alteration after data acquisition become difficult.

[0006]The seal (sealing) of an image pick-up part, an encipherment information synthesizing means, and the nonvolatile storage means is carried out mechanically and electrically by storing means, and if they do not destroy a part of storing means, they have structure which cannot access an inside. And when a seal of a storing means is broken, can recognize visually easily by a discriminating means, and. It is electrically detected by an opening detection

means, the alteration checking means operates based on this detection, and it is preventing from using data within a nonvolatile storage means by elimination, destruction, and other suitable methods.

[0007]The credibility of data can be proved and sufficient material evidence nature for shot data can be given because this compares data saved in an inside of an electronic camera, and data taken out outside via a data output part.

[0008]

[Embodiment of the Invention]The desirable embodiment of the electronic camera built over this invention according to an accompanying drawing below is described. Drawing 1 is a block diagram showing the composition of the electronic camera concerning an embodiment of the invention. This electronic camera 10 is added to the fundamental component of electronic cameras, such as the taking lens 12, the image pick-up part 14, the finder combination monitor 16, the power supply section 18, and the image recording input-and-output (I/O) part 20. It has the GPS receiving set 22 which receives the electric wave from a GPS Satellite, the encipherment information synchronizer 24, the photography shot recording memory (equivalent to a nonvolatile storage means) 26, the internal clock (time check a means fairly) 28, and the backup internal power supply 30.

[0009]Especially, . Mechanical [in the case 32 (equivalent to a storing means)] about the portion (element) concerning acquisition and record of the data of the image pick-up part 14, the GPS receiving set 22, the encipherment information synchronizer 24, the internal clock 28, the backup internal power supply 30, the image recording I/O part 20, the photography shot recording memory 26, etc. And it is stored where a seal (sealing) is carried out electrically, and it has structure which cannot alter data from the exterior.

[0010]. [whether an inside can be accessed, if the case 32 is pasted up or welded and does not specifically destroy the case 32, and] Or it enables it to check opening physically by making it the structure which cannot access an inside unless it is sealed in the screw (un-illustrating) which joins the case 32, it destroys a seal and it removes a screw. The opening detecting switch 34 is formed in the inside of the case 32 by which the seal was carried out, or the case 32, if the seal of the case 32 is broken, the opening detecting switch 34 will operate, the information in the photography shot recording memory 26 is eliminated, and it is constituted so that opening can be distinguished also electrically.

[0011]The image pick-up part 14 is changed into electronic image data through predetermined signal processing, after photoelectric conversion of the object image which carried out image formation to the acceptance surface of the image sensor via the taking lens 12 is carried out here including image sensors, such as CCD which is not illustrated. GPS (earth positioning system) is a system which can receive the electric wave transmitted from two or more satellites launched by the universe, and can know the exact position on the earth in real time like common knowledge. The position and information on time are included in the electric wave emitted from each satellite, and the exact information on the present position (camera station) and time (photographing date) on the earth can be acquired by receiving the electric wave from a satellite with the GPS receiving set 22.

[0012]The position and date information which were acquired from the GPS receiving set 22 are added to the image data of the photographic subject photoed through the image pick-up part 14, and these data is recorded on it with the information on the device individual numbers (equivalent to individual identification numerals) of the electronic camera 10 concerned. In particular, in consideration of the prevention from alteration of data, according to a secret format, it is enciphered in the encipherment information synchronizer 24, and distributed record of the data of a camera station and time and the data of device individual numbers is carried out into picture information.

[0013]For example, it is possible to embed as a code all over a picture in the way of a digital

watermark. Unlike the writing to the header information of the file usually performed, by performing such encryption processing, the difficulty of an alteration of data becomes high. In this way, the enciphered data can be accepted and decoded by using predetermined decoding software, and alteration of data and an alteration become much more difficult by securing the format of encryption, and the confidentiality of decoding software.

[0014]the image data into which a camera station and other attached information were woven in the encipherment information synchronizer 24 passes the image recording I/O part 20 -- read -- it is recorded on the bubble medium (for example, external recording media, such as a mass image memory card) 36. Data may be transmitted to another server etc. which are replaced with the writing of the data to the external recording media 36, and are not illustrated using the transmission device 38.

[0015]Nonvolatile memory is used for the photography shot recording memory 26, Record-keeping of the camera station of all the taken images photoed by the electronic camera 10 concerned and each photography shot, time, picture data size information, and the other attached information is carried out to this photography shot recording memory 26 simultaneously with photography. Although the photography shot recording memory 26 cannot make writing and correction of data by access from the electronic camera 10 outside, read-out of data is possible for it via the image recording I/O part 20.

[0016]Thus, since picture information and its attached information are saved simultaneously with photography at built-in nonvolatile memory (photography shot recording memory 26) and it was made to keep the information about all the photoed shots, It becomes possible to prove the credibility of data by comparing the data which was written in the external recording media 36 and taken out by the exterior of the electronic camera 10, and the data kept inside the device of the electronic camera 10.

[0017]Since it has the structure where the data of the photography shot recording memory 26 is eliminated if the opening detecting switch 34 detects opening of the case 32, the alteration of the data kept in the device of the electronic camera 10 is impossible. Processing special to data besides the method of eliminating data as a method of making use impossible the data in the photography shot recording memory 26 may be performed, and data may be processed or destroyed.

[0018]A series of sequences from the unsealing detection of the case 32 to data cancellation are performed by the electric power supply from the backup internal power supply 30, and even if there is no usual external power 18, they operate. Therefore, it is guaranteed that the data currently preserved by the nonvolatile memory (photography shot recording memory 26) built in the electronic camera 10 is the genuine data acquired by the photography which used the electronic camera 10 concerned.

[0019]By the way, when the electric wave from GPS Satellites, such as indoor, is unreceivable (at the time of GPS radio wave un-reaching), that is displayed on the finder combination monitor 16, and a photography person is notified. When performing photography under this GPS radio wave situation where it does not reach, Although the exact position and date information by a GPS radio wave are unacquirable, the time which the internal clock 28 shows, and the lapsed time after a GPS radio wave is un-reaching are recorded on the photography shot recording memory 26 with image data, using the internal clock 28 as a second best measure.

[0020]And after taking a photograph under GPS radio wave the situation where it does not reach, it moves to the good point of a radio wave state as promptly as possible, GPS operation is checked, and photography for a check is performed there. Since the information on the exact camera station and time based on a GPS radio wave is added and recorded on the photographed image data for this check, The approximation nature of the position (place) from which both data was acquired can be presumed by combining the data for the check

concerned, and the data acquired under the electric wave situation where it does not reach.
[0021]That is, since the error span of both camera station can presume to some extent based on the lapsed time from the photography under electric wave the situation where it does not reach to the photographed-image-data acquisition for a check, the approximate guarantee of the position information which diverts the camera station information on the image data for a check, and starts the data under electric wave the situation where it does not reach can be offered. In order to utilize effectively the electronic camera constituted like the above, the material evidence nature of data is secured by setting an appropriate public institution which is a court and carrying the data obtained by photography and the photoed electronic camera 10 into a public institution. [0022]Namely, in a public institution, it is shown that the seal of the case 32 of the electronic camera 10 is maintained, It becomes possible to guarantee the credibility of data by comparing the photography shot data currently kept by the nonvolatile memory (26) in a camera as compared with the data currently recorded on the medium of the external recording media 36 grade. About the information enciphered, it is letting image data pass to predetermined decoding software, and specification of a camera station (place), a photographing date, and the electronic camera used for photography can be performed.
[0023]Generally except for a public institution, only the inspection of data of the code format used when embedding attached information, such as a camera station and time, to image data is enabled by using predetermined decoding software to a third party as what is not exhibited. By using such an electronic camera, it becomes possible to give material evidence nature to the data photoed with the electronic camera 10 concerned.
[0024]Although the above-mentioned embodiment explained the electronic camera which records a still picture to the example, this invention is applicable also to the electronic camera which records an animation.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The block diagram showing the composition of the electronic camera concerning an embodiment of the invention

[Description of Notations]

- 10 -- Electronic camera
- 12 -- Taking lens
- 14 -- Image pick-up part
- 20 -- Image recording I/O part (equivalent to a data output part)
- 22 -- GPS receiving set
- 24 -- Encipherment information synchronizer
- 26 -- Photography shot recording memory (equivalent to a nonvolatile storage means)
- 30 -- Backup internal power supply
- 32 -- Case (equivalent to a storing means)

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34 -- Opening detecting switch

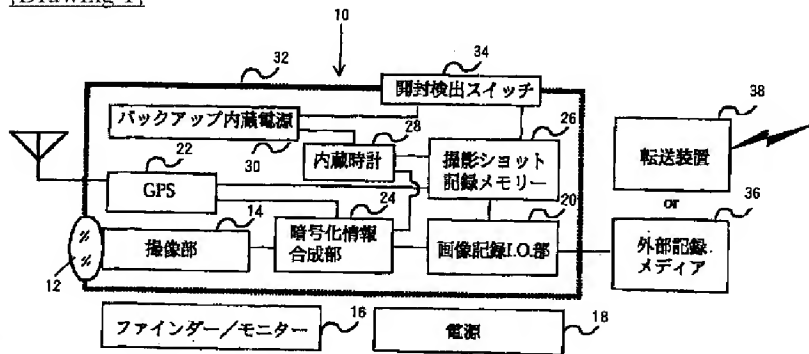
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DRAWINGS

[Drawing 1]



(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号
特開2000-101884
(P2000-101884A)

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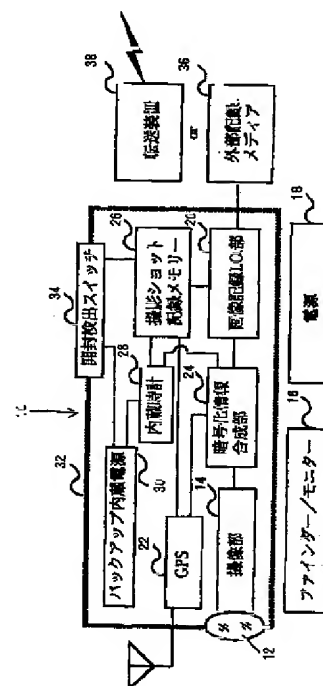
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(54) 【発明の名称】 電子カメラ

(57) 【要約】

【課題】 電子カメラで撮影した画像のデータに撮影日時及び位置の情報を加えると共に、それらデータの変造や改ざんを防止して撮影データに十分な証拠物件性を持たせる。

【解決手段】 撮像部14で撮影した画像データに、GPS受信装置22から得た位置及び日時情報を付加すると共に、当該電子カメラ10の個体識別符号を付加し、これらデータを非公開のフォーマットにしたがって暗号化して画像情報の中に分散記録する。全ての撮影ショットについて内蔵の不揮発性メモリ（撮影ショット記録メモリ）26にデータを保存し、画像記録1/O部20から外部にデータを取り出せるように構成する。また、筐体32は機械的、電気的にシールされ、物理的にも開封の有無を視認できる構造にすると共に、開封検出スイッチ34を設けて開封検知に呼応して前記メモリ26内のデータを消去する。



【特許請求の範囲】

【請求項1】 被写体からの光を電気信号に変換し、被写体像を示す電子画像データを得る撮像部と、GPS衛星からの電波を受信するGPS受信装置と、前記撮像部を介して取得した撮影画像データに、前記GPS受信装置で受信した電波に基づいて取得した撮影位置及び日時の情報と、当該電子カメラの個体識別符号を示す情報とを付加するとともに、これらの情報を所定のフォーマットにしたがって暗号化する暗号化情報合成手段と、前記暗号化情報合成手段を経たデータを記録する不揮発性記憶手段と、前記暗号化情報合成手段を経たデータを当該装置の外部に取り出すためのデータ出力部と、前記撮像部、前記暗号化情報合成手段、及び前記不揮発性記憶手段を包囲し、これらを機械的及び電氣的に密閉する収納手段と、前記収納手段の開封の有無を外觀上判別可能な開封判別手段と、前記収納手段の開封の有無を電氣的に検出する開封検出手段と、前記開封検出手段により開封が検知された場合に前記不揮発性記憶手段に記憶されているデータを使用不能にする改ざん阻止手段と、を備えたことを特徴とする電子カメラ。

【請求項2】 バックアップ電源を内蔵し、前記開封検出手段による開封の関知から前記改ざん阻止手段の作動までの一連のシークエンスが前記バックアップ電源からの電源供給によって行われることを特徴とする請求項1記載の電子カメラ。

【請求項3】 計時手段を内蔵し、GPS衛星からの電波を受信できない状況の下で撮影した場合には、前記計時手段に基づく時刻と、電波が到達しなくなってからの経過時間とを撮影画像データに付加して記録するようにしたことを特徴とする請求項1記載の電子カメラ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は電子カメラに係り、特に撮影日時や撮影場所などの情報を画像データと共に記録するとともに、データの変造や改ざんを防止することができる電子カメラに関する。

【0002】

【従来の技術】従来からビデオカメラにより撮影した画像データに証拠物件性を持たせる提案がなされている（特開平8-97927号公報、特開平7-50827号公報）。例えば、特開平8-97927号公報では、GPS（グローバル・ポジショニング・システム）を利用して、画像データに撮影日時（時間データ）と撮影場所（位置データ）とを合成する方法が開示されている。

【0003】

【発明が解決しようとする課題】しかしながら、従来提案されている方法では、データ取得後の変造や改ざんに対しての保護対策は不完全で脆弱なものである。本発明はこのような事情に鑑みてなされたもので、撮影した画像のデータに撮影日時及び位置の情報を加えると共に、それらデータの変造や改ざんを防止して撮影データに十分な証拠物件性を持たせることを可能にする電子カメラを提供することを目的とする。

【0004】

【課題を解決するための手段】前記目的を達成するために本発明に係る電子カメラは、被写体からの光を電気信号に変換し、被写体像を示す電子画像データを得る撮像部と、GPS衛星からの電波を受信するGPS受信装置と、前記撮像部を介して取得した撮影画像データに、前記GPS受信装置で受信した電波に基づいて取得した撮影位置及び日時の情報と、当該電子カメラの個体識別符号を示す情報とを付加するとともに、これらの情報を所定のフォーマットにしたがって暗号化する暗号化情報合成手段と、前記暗号化情報合成手段を経たデータを記録する不揮発性記憶手段と、前記暗号化情報合成手段を経たデータを当該装置の外部に取り出すためのデータ出力部と、前記撮像部、前記暗号化情報合成手段、及び前記不揮発性記憶手段を包囲し、これらを機械的及び電氣的に密閉する収納手段と、前記収納手段の開封の有無を外觀上判別可能な開封判別手段と、前記収納手段の開封の有無を電氣的に検出する開封検出手段と、前記開封検出手段により開封が検知された場合に前記不揮発性記憶手段に記憶されているデータを使用不能にする改ざん阻止手段と、を備えたことを特徴としている。

【0005】本発明によれば、撮像部を通して撮影した画像データに、GPS受信装置から得た撮影位置及び日時情報を自動的に付加すると共に、これら情報を当該電子カメラの個体識別符号の情報と共に記録する。かかる記録処理に際しては所定のフォーマットに従って情報を暗号化するのでデータ取得後の変造・改ざんは困難になる。

【0006】また、撮像部、暗号化情報合成手段、及び不揮発性記憶手段は収納手段によって機械的及び電氣的にシール（密閉）されており、収納手段の一部を破壊しなければ内部にアクセスできない構造となっている。そして、収納手段のシールが破られた場合には判別手段によって容易に視認することができると共に、開封検出手段によって電氣的に検知され、かかる検知に基づいて改ざん阻止手段が作動し、不揮発性記憶手段内のデータを消去、破壊その他適当な方法によって使用できないようにしている。

【0007】これにより、電子カメラ内部に保存されているデータと、データ出力部を介して外部に取り出されたデータとを照合することで、データの信憑性を実証することができ、撮影データに十分な証拠物件性を持たせ

ることができる。

【0008】

【発明の実施の形態】以下添付図面に従って本発明に係る電子カメラの好ましい実施の形態について説明する。図1は本発明の実施の形態に係る電子カメラの構成を示すブロック図である。この電子カメラ10は、撮影レンズ12、撮像部14、ファインダー兼用モニタ16、電源部18、画像記録入出力(I/O)部20、など電子カメラの基本的な構成要素に加えて、GPS衛星からの電波を受信するGPS受信装置22と、暗号化情報合成部24と、撮影ショット記録メモリ(不揮発性記憶手段に相当)26と、内蔵時計(計時手段に相当)28と、バックアップ内蔵電源30と、を備えている。

【0009】特に、撮像部14、GPS受信装置22、暗号化情報合成部24、内蔵時計28、バックアップ内蔵電源30、画像記録I/O部20、及び撮影ショット記録メモリ26などデータの取得及び記録に係わる部分(要素)については筐体32(収納手段に相当)内に機械的及び電気的にシール(密閉)された状態で収納され、外部からデータの変造が行えない構造になっている。

【0010】具体的には、筐体32が接着若しくは融着されており、筐体32を破壊しなければ内部にアクセスできないか、または、筐体32を接合するネジ(不図示)が封印されていて、封印を破壊してネジを外さないと内部にアクセスできない構造にすることで、開封を物理的に確認できるようにする。更に、シールされた筐体32もしくは、筐体32の内部に開封検出スイッチ34が設けられ、筐体32のシールが破られると開封検出スイッチ34が作動して、撮影ショット記録メモリ26内の情報を消去し、電気的にも開封を判別できるように構成される。

【0011】撮像部14は図示せぬCCD等の撮像素子を含み、撮影レンズ12を介して撮像素子の受光面に結像した被写体像はここで光電変換された後、所定の信号処理を経て電子画像データに変換される。GPS(地球測位システム)は周知の如く、宇宙に打ち上げられた複数の衛星から送信されてくる電波を受信して地球上の正確な位置をリアルタイムで知ることができるシステムである。各衛星から発せられる電波にはその位置と時刻の情報が含まれており、GPS受信装置22によって衛星からの電波を受信することにより、地球上における現在の位置(撮影位置)と日時(撮影日時)の正確な情報を得ることができる。

【0012】撮像部14を通して撮影した被写体の画像データには、GPS受信装置22から得た位置及び日時情報が付加され、これらデータは当該電子カメラ10の装置個体番号(個体識別符号に相当)の情報とともに記録される。特に、データの変造防止に配慮して、撮影位置、日時のデータ及び装置個体番号のデータは、非公開

のフォーマットにしたがって暗号化情報合成部24において暗号化され、画像情報の中に分散記録される。

【0013】例えば、デジタル透かしの要領で画像全面に暗号として埋め込むことが考えられる。このような暗号化処理を行うことにより、通常行われるファイルのヘッダー情報への書き込みとは異なり、データの改ざんの難易度が高くなる。こうして暗号化されたデータは、所定の復号ソフトを用いることによるのみ解読することが可能で、暗号化のフォーマット及び復号ソフトの機密性を確保することによりデータの変造、改ざんが一層困難になる。

【0014】暗号化情報合成部24において撮影位置その他の付属情報が織り込まれた画像データは画像記録I/O部20を介してリムーバブルな媒体(例えば、大容量イメージメモリカードなどの外部記録メディア)36に記録される。なお、外部記録メディア36へのデータの書き込みに代えて転送装置38を用い、図示しない別のサーバ等にデータを伝送してもよい。

【0015】また、撮影ショット記録メモリ26には不揮発性メモリが用いられ、当該電子カメラ10によって撮影された全ての撮影画像、並びに各撮影ショットの撮影位置、日時、画像データサイズ情報その他の付属情報は、撮影と同時にこの撮影ショット記録メモリ26に記録保存される。なお、撮影ショット記録メモリ26は電子カメラ10外部からのアクセスによってデータの書き込み・修正を行うことはできないが、画像記録I/O部20を介してデータの読み出しは可能となっている。

【0016】このように、撮影と同時に内蔵の不揮発性メモリ(撮影ショット記録メモリ26)に画像情報とその付属情報を保存し、撮影された全ショットについてその情報を保管するようにしたので、外部記録メディア36に書き込まれるなどして電子カメラ10の外部に取り出されたデータと、電子カメラ10の装置内部に保管されたデータとを照合することで、データの信憑性を実証することが可能になる。

【0017】更に、開封検出スイッチ34が筐体32の開封を検知すると、撮影ショット記録メモリ26のデータが消去される構造になっているので、電子カメラ10の装置内に保管されたデータの改ざんは不可能である。なお、撮影ショット記録メモリ26内のデータを使用不能にする方法としては、データを消去する方法の他、データに特別な処理を施してデータを加工又は破壊してもよい。

【0018】筐体32の開封検知からデータ破棄までの一連のシーケンスは、バックアップ内蔵電源30からの電力供給によって行われ、通常の外部電源18がなくても作動するようになっている。したがって、電子カメラ10に内蔵した不揮発性メモリ(撮影ショット記録メモリ26)に保全されているデータは、当該電子カメラ10を用いた撮影によって取得された真正のデータであ

ることが保証される。

【0019】ところで、屋内などGPS衛星からの電波を受信できない時（GPS電波不到達時）には、その旨をファインダー兼用モニタ16に表示して撮影者に通知する。かかるGPS電波不到達状況下において撮影を実行する場合は、GPS電波による正確な位置及び日時情報を取得することはできないが、次善の措置として内蔵時計28を用い、内蔵時計28が示す時刻と、GPS電波が不到達になってからの経過時間とを画像データと共に撮影ショット記録メモリ26に記録する。

【0020】そして、GPS電波不到達状況の下で撮影を実施した後、できる限り速やかに電波状況の良好な地点まで移動してGPS稼働を確認し、そこで確認用の撮影を行う。この確認用の撮影画像データにはGPS電波に基づく正確な撮影位置と日時の情報が付加されて記録されるので、当該確認用のデータと、電波不到達状況下で取得したデータとを組み合わせることによって、両データが取得された位置（場所）の近似性を推定することができる。

【0021】即ち、電波不到達状況下での撮影から確認用の撮影画像データ取得までの経過時間に基づいて、両者の撮影位置の誤差範囲がある程度推定できるので、確認用の画像データの撮影位置情報を流用して電波不到達状況下のデータに係る位置情報の近似的保証を行うことができる。上記の如く構成された電子カメラを有効に活用するためには、裁判所のようなしかるべき公的機関を定めておき、撮影により得られたデータと、撮影を行った電子カメラ10とを公的機関に持ち込むことにより、データの証拠物件性を確保する。

【0022】即ち、公的機関において、電子カメラ10の筐体32のシールが保たれていることを提示し、カメラ内の不揮発性メモリ（26）に保管されている撮影ショットデータを、外部記録メディア36等の媒体に記録されているデータと比較し照合することによってデータの信憑性を保証することが可能となる。暗号化されている情報については、所定の復号ソフトに画像データを通すことで、撮影位置（場所）、撮影日時、及び撮影に使用された電子カメラの特定ができる。

【0023】画像データに対して撮影位置、日時などの付属情報を埋め込む時に使用する暗号フォーマットは、公的機関を除いて、一般には公開しないものとして、第

三者に対しては所定の復号ソフトを使用することによりデータの閲覧のみ可能とする。このような電子カメラを用いることにより、当該電子カメラ10にて撮影したデータに証拠物件性を持たせることが可能になる。

【0024】上記実施の形態では、静止画を記録する電子カメラを例に説明したが、本発明は動画を記録する電子カメラにも適用することができる。

【0025】

【発明の効果】以上説明したように本発明に係る電子カメラによれば、撮影部を通して取得した画像データに、GPSを利用して撮影位置及び日時情報を自動的に付加すると共に、当該電子カメラの個体識別符号を付加して、これらデータを暗号化して記録するようにしたので、データ取得後の変造・改ざんが困難で、撮影画像データに証拠物件性を持たせることができる。

【0026】特に、本発明の電子カメラは、収納手段の一部を破壊しなければ内部にアクセスできない構造となっており、収納手段のシールが破られた場合には判別手段によって容易に視認することができると共に、開封検出手段によって電気的に検知され、かかる検知に基づいて不揮発性記憶手段内のデータを消去するなど、データを使用出来ないようにしたので、電子カメラ内部の不揮発性記憶手段に保存されるデータと、データ出力部を介して外部に取り出されたデータとを照合することで、データの信憑性を実証することができ、撮影データに十分な証拠物件性を持たせることができる。

【図面の簡単な説明】

【図1】本発明の実施の形態に係る電子カメラの構成を示すブロック図

【符号の説明】

- 10…電子カメラ
- 12…撮影レンズ
- 14…撮像部
- 20…画像記録I/O部（データ出力部に相当）
- 22…GPS受信装置
- 24…暗号化情報合成部
- 26…撮影ショット記録メモリ（不揮発性記憶手段に相当）
- 30…バックアップ内蔵電源
- 32…筐体（収納手段に相当）
- 34…開封検出スイッチ

